

What is claimed is:

1. A color interpolation calculation method, is utilized in a image process system, comprising:

5 providing a image data array, wherein the image data array constructed of a plurality of image sampling data combination is with M rows and N columns and the plurality of image sampling data combination is constructed of a first data row and a second data row wherein the first data row is constructed of a plurality of first sampling data and a plurality of second sampling data spaced in-between, and the second row is  
10 constructed of a plurality of third sampling data and a plurality of forth sampling data spaced in-between, and the plurality of second sampling data are a first-color if the plurality of first sampling data are a third-color, and the plurality of forth sampling data are a second-color if the plurality of third sampling data are the first-color;

performing a first interpolation process onto a third sampling data of the plurality  
15 of third sampling data of a N-2 column of the second data row of a first image sampling data combination of the plurality of image sampling data combination, wherein the first interpolation process comprising:

performing a first first-color mean value computation to obtain a first first-color mean value of the third sampling data;

20 performing a first second-color interpolation computation to obtain a first second-color interpolation of the third sampling data; and

performing a first third-color interpolation computation to obtain a first third-color interpolation of the third sampling data; and

performing a second interpolation process onto a second sampling data of the  
25 plurality of second sampling data of a N-1 column of the first data row of a second

image sampling data combination of the plurality of image sampling data combination,  
wherein the second interpolation process comprising:

performing a second first-color mean value computation to obtain a second  
first-color mean value of the second sampling data;

5 performing a second second-color interpolation computation to obtain a  
second second-color interpolation of the second sampling data; and

performing a second third-color interpolation computation to obtain a second  
third-color interpolation of the second sampling data; and

performing a third interpolation process to a forth sampling data of the plurality  
10 of forth sampling data of a N-1 column of the second data row of a first image  
sampling data combination of the plurality of image sampling data combination,  
wherein the third interpolation process comprising:

performing a second-color mean value computation to obtain a second-color  
mean value of the forth sampling data;

15 performing a first first-color interpolation computation to obtain a first first-  
color final interpolation of the forth sampling data; and

performing a third third-color interpolation computation to obtain a third  
third-color interpolation of the forth sampling data; and

performing a forth interpolation process onto a first sampling data of the  
20 plurality of first sampling data of a N-2 column of the first data row of a second image  
sampling data combination of the plurality of image sampling data combination,  
wherein the forth interpolation process comprising:

performing a third-color mean value computation to obtain a third-color mean  
value of the first sampling data;

25 performing a second first-color interpolation computation to obtain a second

first-color final interpolation of the first sampling data; and

performing a third second-color interpolation computation to obtain a third second-color interpolation of the first sampling data.

5        2. The method of claim 1, wherein the first-color is green.

3. The method of claim 1, wherein the second-color is blue.

4. The method of claim 1, wherein the third-color is red.

10       5. The method of claim 1, wherein the M is a first integer that is not smaller than 3.

15       6. The method of claim 1, wherein the N is a second integer that is not smaller than 6.

20       7. The method of claim 1, wherein the first first-color mean value computation is to add the second sampling data of the plurality of second sampling data of the N-3 column of the first data row of the first image sampling data combination, the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the first image sampling data combination, the second sampling data of the plurality of second sampling data of the N-3 column of the first data row of the second image sampling data combination and the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination to obtain a result of addition, and then to perform an

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average computation with the result of addition to obtain the first first-color mean value.

8. The method of claim 1, wherein the second first-color mean value computation is to add the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination, the third sampling data of the plurality of third sampling data of the N column of the second data row of the first image sampling data combination, the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the second image sampling data combination and the third sampling data of the plurality of third sampling data of the N column of the second data row of the second image sampling data combination to obtain a result of addition, and then to perform an average computation with the result of addition to obtain the second first-color mean value.

9. The method of claim 1, wherein the second-color mean value computation is to add the forth sampling data of the plurality of forth sampling data of the N-3 column of the second data row of the first image sampling data combination, the forth sampling data of the plurality of forth sampling data of the N-1 column of the second data row of the first image sampling data combination, the forth sampling data of the plurality of forth sampling data of the N+1 column of the second data row of the first image sampling data combination and the first second-color interpolation of the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination to obtain a result of addition, and then to perform an average computation with the result of addition to obtain the

second-color mean value.

10. The method of claim 1, wherein the third-color mean value computation is to add the first sampling data of the plurality of first sampling data of the N-4 column of the first data row of the second image sampling data combination, the first sampling data of the plurality of first sampling data of the N-2 column of the first data row of the second image sampling data combination, the first sampling data of the plurality of first sampling data of the N column of the first data row of the second image sampling data combination and the second third-color interpolation of the second sampling data of the plurality of second sampling data of the N-3 column of the first data row of the second image sampling data combination to obtain a result of addition, and then to perform an average computation with the result of addition to obtain the third-color mean value.

11. The method of claim 1, wherein the first second-color interpolation computation is to perform a average computation with the forth sampling data of the plurality of forth sampling data of the N-3 column of the second data row of the first image sampling data combination and the forth sampling data of the plurality of forth sampling data of the N-1 column of the second data row of the first image sampling data combination to obtain a first average value, and then the result of the first average value multiplied by the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination, is divided by the first first-color mean value to obtain the first second-color interpolation.

12. The method of claim 1, wherein the first third-color interpolation

computation is to perform a average computation with the first sampling data of the plurality of first sampling data of the N-2 column of the first data row of the first image sampling data combination and the first sampling data of the plurality of first sampling data of the N-2 column of the first data row of the second image sampling data combination to obtain a second average value, and then the result of the second average value multiplied by the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination is divided by the first first-color mean value to obtain the first third-color interpolation.

13. The method of claim 1, wherein the second third-color interpolation computation is to perform a average computation with the first sampling data of the plurality of first sampling data of the N-2 column of the first data row of the second image sampling data combination and the first sampling data of the plurality of first sampling data of the N column of the first data row of the second image sampling data combination to obtain a third average value, and then the result of the third average value multiplied by the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination is divided by the second first-color mean value to obtain the second third-color interpolation.

14. The method of claim 1, wherein the second second-color interpolation computation is to perform an average computation with the forth sampling data of the plurality of forth sampling data of the N-1 column of the second data row of the first image sampling data combination and the forth sampling data of the plurality of forth sampling data of the N-1 column of the second data row of the second image sampling

data combination to obtain a forth average value, and then the result of the forth average value multiplied by the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination is divided by the second first-color mean value to obtain the second  
5 second-color interpolation.

15. The method of claim 1, wherein the first first-color interpolation computation comprising:

performing a first differential computation to obtain a first horizontal differential  
10 and a first vertical differential;

performing a first average computation to obtain a first horizontal average and a first vertical average;

performing a first first-color initial interpolation computation to obtain a first first-color initial interpolation; and

15 obtaining the first first-color final interpolation that is a result of the first first-color initial interpolation multiplied by the forth sampling data of the plurality of forth sampling data of the N-1 column of the second data row of the first image sampling data combination and divided by the second-color mean value.

20 16. The method of claim 15, wherein the first differential computation comprising:

obtaining the first horizontal differential that is an absolute value of the third sampling data of the plurality of third sampling data of the N column of the second data row of the first image sampling data combination minus the third sampling data of  
25 the plurality of third sampling data of the N-2 column of the second row of the first

image sampling data combination; and

obtaining the first vertical differential that is an absolute value of subtraction of the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination minus the second  
5 sampling data of the plurality of second sampling data of the N-1 column of the first data row of the first image sampling data combination.

17. The method of claim 15, wherein the first average computation comprising:

obtaining the first horizontal average that is a result of an average of the third  
10 sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination and the third sampling data of the plurality of third sampling data of the N column of the second data row of the first image sampling data combination; and

obtaining the first vertical average that is a result of an average of the second  
15 sampling data of the plurality of second sampling data of the N-1 column of the first data row of the first image sampling data combination and the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination.

20 18. The method of claim 15, wherein the first first-color initial interpolation computation comprising:

obtaining a first value that is a result of the first horizontal average multiplied by the first vertical differential and divided by a result of an addition of the first vertical differential and the first horizontal differential;

25 obtaining a second value that is a result of the first vertical average multiplied by



the first horizontal differential and divided by a result of an addition of the first vertical differential and the first horizontal differential; and

obtaining the first first-color initial interpolation that is a result of an addition of the first value and the second value.

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19. The method of claim 1, wherein the second first-color interpolation computation comprising:

performing a second differential computation to obtain a second horizontal differential and a second vertical differential;

10 performing a second average computation to obtain a second horizontal average and a second vertical average;

performing a second first-color initial interpolation computation to obtain a second first-color initial interpolation; and

15 obtaining the second first-color final interpolation that is a result of the second first-color initial interpolation multiplied by the first sampling data of the plurality of first sampling data of the N-2 column of the first data row of the second image sampling data combination and divided by the third-color mean value.

20 20. The method of claim 19, wherein the second differential computation comprising:

25 obtaining the second horizontal differential that is an absolute value of the second sampling data of the plurality of second sampling data of the N-1 column of the first row of the second image sampling data combination minus the second sampling data of the plurality of second sampling data of the N-3 column of the first row of the second image sampling data combination; and

obtaining the second vertical differential that is a absolute value of the third sampling data of the plurality of third sampling data of the N-2 column of the second row of the second image sampling data combination minus the third sampling data of the plurality of third sampling data of the N-2 column of the second row of the first image sampling data combination

21. The method of claim 19, wherein the second average computation comprising:

obtaining the second horizontal average that is a result of an average of the second sampling data of the plurality of second sampling data of the N-3 column of the first data row of the second image sampling data combination and the second sampling data of the plurality of second sampling data of the N-1 column of the first data row of the second image sampling data combination; and

obtaining the second vertical average that is a result of an average of the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the first image sampling data combination and the third sampling data of the plurality of third sampling data of the N-2 column of the second data row of the second image sampling data combination.

22. The method of claim 19, wherein the first first-color initial interpolation computation comprising:

obtaining a third value that is a result of the second horizontal average multiplied by the second vertical differential and divided by a result of an addition of the second vertical differential and the second horizontal differential;

obtaining a forth value that is a result of the second vertical average multiplied

by the second horizontal differential and divided by a result of an addition of the second vertical differential and the second horizontal differential; and

obtaining the second first-color initial interpolation that is a result of an addition of the third value and the forth value.

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23. The method of claim 1, wherein the third third-color interpolation computation comprising:

obtaining a third-color edge average that is an average of the first sampling data of the plurality of first sampling data of the N-2 column of the first row of the first image sampling data combination, the first sampling data of the plurality of first sampling data of the N column of the first row of the first image sampling data combination, the first sampling data of the plurality of first sampling data of the N-2 column of the first row of the second image sampling data combination and the first sampling data of the plurality of first sampling data of the N column of the first row of the second image sampling data combination; and

obtaining the third third-color interpolation that is a result of the third-color edge average multiplied by the forth sampling data of the plurality of forth sampling data of the N-1 column of the second row of the first image sampling data combination and divided by the second-color average.

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24. The method of claim 1, wherein the third second-color interpolation computation comprising:

obtaining a second-color edge average that is an average of the forth sampling data of the plurality of forth sampling data of N-3 column of the second row of the first image sampling data combination, the forth sampling data of the plurality of forth

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sampling data of N-1 column of the second row of the first image sampling data combination, the forth sampling data of the plurality of forth sampling data of N-3 column of the second row of the second image sampling data combination and the forth sampling data of the plurality of forth sampling data of N-1 column of the second row of the second image sampling data combination; and

obtaining the third second-color interpolation that is a result of the second-color edge average multiplied by the first sampling data of the plurality of first sampling data of the N-2 column of the first row of the second image sampling data combination and divided by the third-color average.

25. A color interpolation processor, which is used in a image process system that consists of a first buffer and a second buffer for receiving a plurality of data rows of a image data array from outside, comprising:

a computation module of common parameters, that is used to receive a first data row, a second data row and a third data row of the plurality of data rows of the image data array, and to perform a computation of common parameters for a plurality of common parameters;

a computation module of horizontal differential and vertical differential, that is used to receive the first data row, the second data row and the third data row of the plurality of data rows of the image data array, and to perform a computation of horizontal differential and vertical differential for a plurality of horizontal differentials and a plurality of vertical differentials;

a computation module of average, that is used to receive the plurality of common parameters from the computation module of common parameters, and to perform an average computation for a plurality of edge averages and a plurality of local means;

a computation module of edge weighting, that is used to receive the plurality of common parameters from the computation module of common parameters, the plurality of horizontal differentials and the plurality of vertical differentials from the computation module of horizontal differential and vertical differential for computing of a plurality of final interpolations; and

a selective module of interpolation, that is used to receive the plurality of final interpolations of the computation module of edge weighting, the plurality of edge averages and the plurality of local means from the computation module of average, and to perform a computation to output a plurality of interpolations, and the plurality of final interpolations corresponding to the first data row, the second data row and the third data row.

26. A color interpolation processor of claim 25, wherein further comprising a parallel process module, that is used to perform a parallel output for the plurality of interpolations and the plurality of final interpolations of the selective module of interpolation.

27. A color interpolation processor of claim 25, wherein the plurality of common parameters comprising a plurality of horizontal averages, a plurality of vertical averages, a plurality of red common parameters and a plurality of blue common parameters.